

Section 12 - Settlement of Disputes

12.1. Any disputes regarding the interpretation or implementation of this MOU will be resolved by consultation between the Participants and will not be referred to an international tribunal or other third part for settlement.

Section 13 - Language and Date of Effect

13.1. This MOU is executed in four originals, two in the English language and two in the French language. Each language text is equally authoritative. This MOU will be effective upon the date on which the last signature is affixed below. The date of the last signature will be entered on the cover sheet as the date of the MOU.

FOR THE SECRETARY OF
DEFENSE OF THE UNITED
STATES OF AMERICA

Stephen P. Condon
(Signature)

STEPHEN P. CONDON, BGen

(Name)

Deputy Assistant Secretary
Acquisition

(Title)

Washington, D.C.

(Place)

17 September 1991

(Date)

FOR THE MINISTER OF
DEFENCE OF FRENCH
REPUBLIC

(Signature)

JGA G. BONNEVAUX
(Name)

Sous directeur Affaires Internationales
Direction de l'Armement Bonnevalle
(Title)

Paris

(Place)

le 26 Aout 1991

(Date)

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L'Ingénieur général de l'armement Bonnevalle

Sous-directeur
Affaires Internationales

PROJECT ARRANGEMENT ONE

TO

MEMORANDUM OF UNDERSTANDING

BETWEEN

THE MINISTER OF DEFENCE OF THE FRENCH REPUBLIC

AND

THE SECRETARY OF DEFENSE OF THE UNITED STATES OF AMERICA

REGARDING

THE COOPERATIVE DEVELOPMENT AND EVALUATION OF

SUPER COCKPIT TECHNOLOGY

17 September 1991

1.0 Preamble: This project is undertaken as part of the cooperative development and evaluation of Super Cockpit technology. The provisions herein are consistent with the Memorandum of Understanding between the Secretary of Defense of the United States of America and the Minister of Defence of the French Republic regarding the Cooperative Development and Evaluation of Super Cockpit Technology. This project will be conducted by the United States Air Force (USAF) as represented by the Harry G. Armstrong Aerospace Medical Research Laboratory (AAMRL) and the Delegue General pour L'Armement (DGA) as represented by Direction Des Constructions Aeronautiques (DCAe). The objective is to accomplish the integration of state of the art virtual systems into crew station configurations tailored for air-to-air and air to ground combat. The integration will be accomplished through a series of iterative engineering simulations combining virtual hardware and software provided from each country's technology base. These simulations will provide quantitative data on the impact of virtual systems on pilot performance in air-to-air/air-to-ground combat as well as select virtual system candidates with potential for flight test. The simulations will also be utilized to develop and test pilot assistance software and the necessary pilot performance measurement hardware and software needed for the quantitative evaluation of virtual systems. The project will be conducted in two phases as follows:

2.0. Project Description:

a. **Phase I:** The key virtual crew station components will be assembled independently into mutually agreed upon crew station configurations within AAMRL and the DCAe and integrated into a laboratory simulation of air-to-air/air-to-ground combat. Parametric simulation will be undertaken, integration software written, symbology sets developed, human performance measures selected, mission scenarios mechanized and appropriate documentation developed. A series of part task simulations will be conducted to confirm hardware configuration and gain confidence in the interface software. A report will be written summarizing the results of these simulations that will constitute the end of Phase I.

b. **Phase II:** Phase II will continue the laboratory simulation activity in both countries with the aim of developing the final virtual systems configuration suitable for flight test and the refinement of visually coupled systems designs. This final configuration will then be subjected to man-in-the-loop mission simulation in order to verify display/control dynamics, display formats, the pilot performance measurement system, and any additional instrumentation required for a quantifiable flight test. In addition, prototype artificial intelligence based assistance systems and pilot incapacity monitoring.

instrumentation will be added as appropriate. Upon completion of Phase II, a final flight test will be selected and a decision made on the desirability of flight test. These results will be documented in a report that shall constitute the completion of Phase II. If mutually agreed that flight testing would be desirable, that activity will constitute another Project Arrangement (PA).

3.0. Unique Responsibilities: It is anticipated that, in general, the advanced technology contributions of each Participant would be as follows:

a. DGA Contributions:

The DGA will loan to the USAF the following material:

(1) 2 Multimode Color Displays

 1 Head-up Display

 1 Head Level Color Display (Phase I)

(2) Incoherent situation detection software module based on pilot intent recognition module (Phase II).

b. USAF Contributions:

The USAF will loan to the DGA:

(1) Integrated visually coupled system to include a helmet mounted display, a head location sensor, shared memory interface, symbol generators, auditory localizer with sound and voice synthesis, and associated software (Phase I).

(2) Two Mini Visually Coupled Airborne Systems Simulator (VCASS) System. This VCASS system is a portable simulator composed of a head location

sensor, a helmet visor, helmet mounted display electronics (mini-television display), and symbol generation software.
(Phase I and II)

(3) One (1) C-VCASS - Binocular visually coupled system to support psychophysical research.

4.0. Mutual Responsibilities: Each Participant will coordinate in the selection of the following elements of the simulation program as appropriate:

- a. Crew station design
- b. Secondary cockpit controls and displays
- c. Weapons mix and switchology to be simulated
- d. Threat systems to be emulated
- e. Pilot subjects for use in the simulation program
- f. Peculiar interface requirements necessitated by the facilities of each country within which the simulations are to be conducted.

5.0. Loaned Material: It is anticipated that the hardware components loaned by each Participant for incorporation into the simulators will be expended in the course of the tests and evaluations hereunder, and not returned to the providing Participant. Maintenance of loaned material will be assumed by the providing participant during the whole duration of the P.A.

6.0. General: It is anticipated that the total project will cover a four year period with approximately equal costs to both Parties estimated to be US \$12 million USD (60 million FF). Each phase will produce at least one final technical report describing performance parameters of all the equipment involved in the testing, the relative merits of various virtual systems configurations as measured by pilot performance, and all engineering and software documentation required for the conduct of the project.

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Jean G. Bonnevalle
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Sous-directeur, Affaires Internationales
(Title)
Direction de l'Aviation Aéronautique

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